

# **CHAPTER 4**

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#### **4.00 General**

The Maintenance Program, Office of Maintenance Equipment and Emergency Operations, Equipment Management, is responsible for monitoring District Maintenance compliance with all requirements in this Chapter.

All major pieces of automotive, maintenance and construction equipment are purchased and maintained by the Equipment Service Center and assigned to Districts or Headquarters Maintenance pool. This equipment is designated as “C” (Caltrans) equipment.

Volume 2 of the Maintenance Manual includes instructions regarding usage and downtime reporting. Rental rates are established and maintained by the Accounting Service Center, Office of Financial Operations and Control.

#### **4.01 License**

Supervisors shall ensure that each operator of equipment has a valid driver’s license and any special endorsements required for the specific type of equipment operated.

#### **4.02 Assignment of Equipment**

The District Equipment Manager shall periodically analyze use of equipment assigned to a Maintenance region or area. The Equipment Manager shall move that equipment within the district to effect the best usage possible.

Districts should use Maintenance and Equipment Service Center usage reports to aid in analysis of equipment use.

#### **4.03 Equipment Catalog**

Caltrans publishes a catalog of equipment available to the districts. This catalog was created to assist the Districts in obtaining the equipment best suited for the job. There are approximately 275 types of equipment in the equipment catalog. The catalog is published in a loose leaf binder so it can be easily updated as new items of equipment are added.

The majority of the available units of equipment are included in the catalog. With rare exceptions, all ordering shall be from the catalog.

#### **4.04 Care and Responsibility**

District Maintenance is responsible for the care and proper use of “C” equipment from the time it is received until it is returned to the Equipment Service Center.

The Maintenance Supervisor, through the equipment operator, is responsible for shift inspection and preventive maintenance. Operators are responsible for detecting the first signs of faulty equipment. They shall use the Pre-op/Post-op checklist for reporting any signs of problems to their supervisors. The supervisor is responsible for making arrangements for repair.

The Pre-op/Post-op checklist books are available through Material Operations Warehouse.

Pre-op inspections and post-operation checks shall be made and recorded on the Pre-op/Post-op checklist by each operator at the beginning and end of each shift. This requirement applies to all equipment rated  $\frac{3}{4}$  ton (0.6084 tonne) and larger. Units rated smaller than  $\frac{3}{4}$  ton (0.6084 tonne) shall be pre-opped once a week.

If repairs are indicated, trouble symptoms shall be recorded on the Repair Request portion of the form prior to submittal to the supervisor. Operators shall follow the instructions on the Pre-op/Post-op book cover. The Pre-op book shall be kept in or on the vehicle.

The District Equipment Manager will make periodic field reviews observing the pre-op/post-op checks of equipment by the crews and will inspect for general condition, modifications and general cleanliness. A report of these reviews will be made to District Maintenance.

The Equipment Service Center is responsible for scheduled lubrication and preventive maintenance. However, there may be occasions when Maintenance personnel will assist in servicing a vehicle.

The following maintenance personnel have the listed responsibilities regarding the Mobile Equipment Preventive Maintenance Program:

Maintenance Superintendents:

- (A) Are responsible for the proper use and care of equipment assigned to their areas.
- (B) Will identify and arrange equipment training for operators and supervisors.
- (C) Will support policies regarding operation, maintenance and minor repair of equipment as taught to operators and supervisors at the Motorized Equipment Training Academy (META).

- (D) Shall enforce the use of the Pre-op and Post-op Check List/Repair Request and Permanent Equipment Maintenance Record (PEMR) books.
- (E) Will provide Equipment Service Center personnel with equipment and access to Maintenance Stations.
- (F) Will make every effort to work with the Equipment Service Center and resident or field mechanics to set priorities for vehicle inspections and repair.

Highway Maintenance Supervisors, First Line Supervisors and Leadworkers:

- (A) Are responsible for the appearance and condition of equipment assigned to or used by their cost centers.
- (B) Will enforce the policies of equipment operations, minor adjustments and repair as instructed by META.
- (C) Will ensure that personnel under their supervision will follow prescribed Lube Folio instructions regarding proper servicing of equipment when required.
- (D) Provide adequate cabinet or space to store a supply of parts and accessories for use by equipment operators.
- (E) Provide proper storage for lubricants with correct product number decals on containers. Provide dust free storage for swing-spout oil dispensers.
- (F) Will record their signature and a date on the repair request portion of the Pre-op/Post-op Check List/Repair Request form if repairs are requested.

Supervisors may only authorize the use of a vehicle with non-safety related defects until the date on the repair request portion. If there are safety related defects, the supervisor will ground the vehicle until repairs are completed.

Supervisors must retain the Daily Pre-op/Post-op sheets for 90 days for audit purposes and file by Item and "C" number.

- (G) Will identify and advise management of operator training needs.

- (H) Shall perform a safety inspection of each unit in his or her cost center. The safety inspection will be performed bi-annually and the inspection date will be recorded in the PEMR book. When using pool assigned equipment, the supervisor will ensure that the inspection is current, and will perform an inspection if one is due. The PEMR book shall be kept with the vehicle.
- (I) Provide Equipment Service Center personnel with access to Maintenance Stations and vehicles.

**Operators (All Employees Who Operate Equipment):**

- (A) Shall follow prescribed methods of equipment operation as instructed by META and their supervisors.
- (B) Shall perform the required pre-op/post-op checks of equipment. The Pre-op/Post-op Check List/Repair Request book shall be used per instructions listed on the book cover.
- (C) Shall follow appropriate lube chart instructions for shift, 40 hour, or minor and major service when required.
- (D) The signature of the person making the pre-op/post-op checks is required in the space provided. The user shall also print his or her last name for identification purposes.
- (E) Shall record major and minor vehicle service in the operator service section of the PEMR book, including the operator's initials in the space provided.

A Permanent Equipment Maintenance Record book will be maintained for each piece of "C" equipment and shall be kept in the equipment at all times. Major and minor servicing, repairs, brake adjustments and inspections on the vehicle will be recorded in the book. These books are supplied by the Equipment Service Center.

Operators are also responsible for making the following minor repairs and adjustments:

- (A) Change light bulbs, fuses and lenses.
- (B) Simple adjustment or replacement of fan belts.
- (C) Replace battery, cables and clean battery connections, when trained to do so.
- (D) Replace wiper blades.

- (E) Perform scheduled services when instructed to as outlined in the PEMR and/or Lubrication Interval Standards in File Section 10 of the Lube Folio, using the proper Lube Chart as a guide.

The above in no way is meant to limit the operator to those repairs. He or she may make other minor repairs as needed at the discretion of his or her supervisor with the approval of a Field Mechanic, Shop Supervisor or District Shop Superintendent.

Equipment which cannot be returned nightly to the Maintenance Station must be parked in a safe place and locked if possible. Do not leave valuable parts unprotected if easily removable from the equipment.

#### **4.05 Transferring Equipment**

To ensure that equipment is used to the extent possible, Districts are encouraged to move equipment within their own district (intra-district), between other districts (inter-district), and to other State agencies when needed.

Temporary transferring between Districts may be arranged by the Districts. Form DM-E87E shall be completed for each transfer. The District Equipment Managers of the Districts involved may handle inter-district movement of equipment. The Equipment Superintendents must be told of transfers of equipment so proper location code changes can be made.

The Maintenance Program, Headquarters Equipment Manager can assist on inter- and intra-district moves, and may be involved in movement of equipment that involves the Maintenance Program and other governmental agencies. Rental of equipment to or from other governmental agencies should be accomplished through use of an Inter-Governmental Service Agreement and Invoice (Form 13A).

#### **4.06 Amber Warning Lights**

Amber warning lights should be provided for maintenance vehicles which are routinely operated on the traveled way at lower traffic speeds and are not equipped with arrow boards.

Warning lights should not be turned on when deadheading at prevailing speeds.

Where amber lights can be justified within the above policy, they may be installed by the Equipment Service Center upon request. The District Equipment Manager will approve justified requests and determine that they meet all legal requirements.

Units not regularly engaged in operations requiring amber lights may occasionally need portable amber lights not permanently mounted on the vehicle. These “plug-in” units will be supplied by the local Equipment Service Center using a proper Local Request. Amber lights of this type will be supplied at the expense of the operating unit and will become its property. The Local Request must include the charge district, unit and expenditure authorization. All Local Requests for amber lights for Maintenance will be approved by the District Equipment Manager.

#### **4.07 Red Warning Lights**

Red warning lights are permitted only on an “authorized emergency vehicle” defined in Section 165 of the California Vehicle Code.

Department of Transportation vehicles classified as “emergency” are those complying with Section 165 of the Vehicle Code. Caltrans equipment is not typically involved in emergencies under the definition of the Code.

#### **4.08 Cost Responsibility-General**

In general, the Equipment Service Center will furnish all motor vehicles and construction equipment. This equipment will be complete with accessories, devices, or services that are standardized, ordinarily used, or legally required, and are provided as necessary in the operation of the unit. Available equipment units are in the Equipment Catalog along with a list of optional equipment.

#### **4.09 Local Request-Review**

Districts shall comply with the latest policies and procedures when unusual working conditions require special devices, accessories or modification to units.

The Shop Superintendent is responsible for determining the proper coding of charges when requests involving improvements or modifications are requested by the operating Programs.

Improvements or modifications to “C” equipment are defined and generally limited to those optional items listed and described in the Equipment Catalog. Improvements or modifications that are not listed as an option in the catalog may be required to increase the capability of “C” equipment. For example, it may be necessary to install items not listed in the catalog. If such items are estimated to cost \$500.00 or less, they may be approved by the Shop Superintendent.



When an item not listed in the catalog is estimated to exceed \$500.00, follow the approval process as outlined on page 4-10. All improvements or modifications become the property and repair responsibility of the Equipment Service Center.

Improvements or modifications are sometimes required due to changes in the industry, or to enable a “C” unit or its components to perform the functions for which they were originally intended. Examples of such improvements include larger engines, improved suspension, and retarder retrofits. Improvements or modifications estimated to cost \$1,000.00 or less may be approved by the Shop Superintendent and are not subject to the approval process. If the cost is estimated to exceed \$1,000.00, the Shop Superintendent shall submit an estimate on a Shop Job Order to the Equipment Service Center, Office of Field Operations, for approval prior to performing improvements or modifications. This \$1,000.00 limit should not be confused with the \$500.00 limit in the preceding paragraph.

There shall be no improvements or modifications made to “C” equipment except by Equipment Service Center employees or approved vendors unless authorized by the Shop Superintendent or Equipment Service Center Headquarters as appropriate.

All Requests for improvements or modifications to “C” equipment from the operating Programs must be supported by a properly justified and approved request with appropriate EAs and SDs.

Any improvements or modifications option requested for a “C” unit that would require an Item Number change shall be done with the concurrence of the appropriate Headquarters Equipment Manager, Equipment Service Center Office of Field Operations, prior to the work being accomplished.

See Figure 4-1 for a matrix that illustrates the responsible parties and appropriate actions to be taken when requesting modification or improvement of “C” equipment.

### Requests to Modify or Improve “C” Equipment

ITEM/SITUATION	UNIT/ACTION
Requests to retrofit 'C' units in the fleet with options listed in Equipment Catalog	<ol style="list-style-type: none"> <li>1. District Equipment Manager makes initial review and/or recommendation.</li> <li>2. Equipment Manager discusses with Shop Superintendent.</li> <li>3. Shop Superintendent provides estimates, recommendations, approval.</li> </ol>
Requests for non-catalog options, or improvements, estimated to cost \$500.00 or less.	<ol style="list-style-type: none"> <li>1. District Equipment Manager makes initial review and/or recommendation.</li> <li>2. District Equipment Manager discusses with Shop Superintendent, proper charge is determined.</li> <li>3. Shop Superintendent provides recommendations, estimates, and approval.</li> <li>4. The District Equipment Manager requests approval of appropriate Headquarters unit and Equipment Service Center Headquarters.</li> </ol>
Requests for non-catalog options, or improvements, estimated to cost more than \$500.00.	<ol style="list-style-type: none"> <li>1. District Equipment Manager makes initial review and/or recommendation.</li> <li>2. Equipment Manager discusses with Shop Superintendent.</li> <li>3. Shop Superintendent provides recommendations, (notes recommendation on the face of the request) makes an estimate on a Shop Job Order, and returns to District Equipment Manager.</li> <li>4. District Equipment Manager forwards request and estimate to the Equipment Standardization Committee for recommendation/approval; if approved, it is sent to Equipment Service Center, Office of Field Operations.</li> <li>5. Equipment Service Center, Office of Field Operations, approves/disapproves and returns to appropriate District Equipment Manager.</li> <li>6. District coordinates work with Shop Superintendent.</li> </ol>

Figure 4-1: Requests to Modify or Improve “C” Equipment

There shall be no modifications or improvements of Caltrans “C” equipment that is nearly obsolete unless legally required to keep unit in operation.

Local Request work for services, or any repair work done on District owned maintenance equipment such as lawn mowers, small pumps, and chain saws should be done by private vendors.

There shall be no modifications or additions made to Caltrans Equipment by Caltrans Maintenance employees unless approved by the Shop Superintendent and District Equipment Manager.

#### **4.10 Lost or Stolen Accessories**

The cost or replacement of lost or stolen accessories or loss due to theft, vandalism, abuse, or neglect while such equipment is in the custody of a district may be charged to the District.

Disciplinary action may be taken when damage or loss is a result of neglect or operator abuse.

#### **4.11 Changes in Location of Accessories.**

Accessories and equipment that are the property of the Equipment Service Center are not to be altered or moved from one vehicle to another without first complying with requirements of Section 4.09.

#### **4.12 Repair**

One of the main functions of the Equipment Service Center is to perform all necessary repairs to equipment. These repairs will be made promptly by one of the Equipment Service Center shops, or the shop may give authorization to have the work accomplished in a suitably equipped commercial shop. For minor repairs, authorization may be given to Maintenance to perform the work.

A Superintendent of Equipment has authority to request release of equipment for repairs when, in his or her opinion, the equipment should be removed from service to prevent progressive mechanical damage. During an emergency, an Equipment Superintendent may permit continued use of equipment despite this damage if a District is unable to make satisfactory substitution.

#### **4.13 Inspection of Steam Boilers and Unfired Pressure Vessels**

Every steam boiler or unfired pressure vessel must be inspected at designated intervals if it is over 6 inches (15.24 centimeters) in diameter, has a holding volume of more than one and one half cubic feet (0.01415 cubic meters), or operates at more than 30 pounds (2.1097 kilograms per square centimeter) pressure per square inch (per square millimeter). The inspector must have a certificate of competency issued by the Department of Industrial Relations, Division of Industrial Safety.

Steam boilers and unfired pressure vessels inspections are to be handled through the Equipment Service Center. Districts shall ensure that these inspections are done.

Operators shall drain air tanks completely of accumulated moisture at least once during each shift of operation. Air brake reservoirs must be drained to remove moisture and contaminants even when a tank is equipped with an air dryer. To ensure the proper function of one-way check valves on dual brake system, tanks must be drained in the following order:

- (A) Supply (wet) reservoir.
- (B) Front service reservoir.
- (C) Rear service reservoir.

Drain each completely before closing drain valve and proceeding to the next. If any reservoir is empty when a valve is first opened (with engine off and system charged), the brake system may be defective. Notify supervisor or Shop forces before further operation.

#### **4.14 Overweight or Oversize Loads**

State equipment carrying overweight or oversize loads must carry a transportation permit authorizing the movement. Obtain annual permits through the Office of Commercial Vehicle Operations and Permits.

#### **4.15 Fire Extinguisher on Equipment**

- (A) Fuel trucks, paint strippers, and asphalt kettles shall be equipped with a 20:BC rated dry chemical or carbon dioxide fire extinguisher.

- (B) Any truck or truck-tractor used to transport hazardous materials shall be equipped with a fire extinguisher having a rating of 10:BC or more.
- (C) Any truck or tractor-trailer combination exceeding 40 feet (12.192 meters) in length will require a fire extinguisher having a rating of 5:BC or more.
- (D) Any 3 axle truck will require a fire extinguisher having a rating of 5:BC or more.
- (E) Any truck or bus used primarily for hauling 7 or more employees to and from the job site will require a fire extinguisher having a rating of 4:BC or more.
- (F) All tow trucks will require a fire extinguisher having a rating of 4:BC or more.
- (G) All certifiable mobile cranes shall have a fire extinguisher rated at 5:BC or more, readily accessible to the operator station.
- (H) All personnel lifts shall be equipped with a fire extinguisher having a rating of 5:BC or more, to be located in truck cab.
- (I) Fire extinguishers are required to be visually inspected monthly by operator and serviced/tested annually.
- (J) Alternate equivalent protection shall be provided when portable extinguishers are removed from service for maintenance and recharging.
- (K) Where portable extinguishers have been provided for employee use in the workplace, there shall be provided an educational program to familiarize employees with the general principles of fire extinguisher use and fire fighting hazards.

#### **4.16 Use of State Car**

Board of Control Rule 847(D) requires that State employees who frequently store State vehicles at or near their residences must have Home Storage Permits. The District Maintenance Office can provide further information about this requirement and the process for obtaining a Home Storage Permit.

#### **4.17 Rental of Non-State-owned Equipment**

When equipment is not available from within Caltrans, the Department is required to make the effort to obtain equipment from another governmental agency prior to renting from a non-governmental source.

Authority to rent equipment is delegated to the Districts in conformance with the following procedures:

(A) Equipment is not Within Immediate Area

If needed equipment is not available in the immediate area, notify the District Equipment Manager. He or she will look for the units within the District.

(B) Equipment is not Within the District

If the equipment is not available in the District, the District Equipment Manager shall look statewide for Caltrans equipment or for equipment from other governmental agencies. The Maintenance Program Headquarters Equipment Manager will assist in this search.

(C) Equipment not Within Caltrans or Other Governmental Agencies

If the equipment is not available within Caltrans or other governmental agencies using District procedures, prepare an equipment rental contract. Make every effort to obtain rented equipment unoperated. The contract should include a justification that indicates the efforts made to obtain equipment either through Caltrans or another government agency. The contract should also include an approval signature by the District Equipment Manager.

There are two basic principles involved in considering use of contract equipment:

- (1) Use Caltrans or other governmentally owned equipment whenever it is reasonably available for maintenance work.
- (2) Do not rent operated equipment to do work that is the normal function of maintenance employees.

When looking for needed equipment, always work through your District Equipment Manager.

He or she will make the required contacts.

Equipment rental contracts should not be requested for the rental of haul trucks to haul materials such as asphalt concrete, cinders, sand, and aggregate. Such materials purchased from a vendor should be delivered by the vendor, or by State forces utilizing State owned equipment. Vendor delivery is generally the preferred approach.

An emergency condition is defined as an unforeseen happening or state of affairs requiring prompt action to protect the health, safety, and welfare of the public. Emergency work is defined as remedial measures required to immediately avert, alleviate, repair, or restore damaged property having a public and State interest.

An emergency situation, however, does not relieve the Caltrans of the requirement to look at its equipment as well as that of other governmental agencies prior to obtaining an outside rental.

A copy of all equipment rental contracts shall be forwarded to the Maintenance Program Equipment Manager, who is also responsible to forward the required notification of rental to the Department of General Services.

To expedite the rental of equipment, the District should advertise quarterly for and maintain a current bidders' list of equipment normally rented by the District. This procedure will drastically reduce time required to process an equipment rental.

Equipment rental should be minimized whenever possible through proper scheduling of work and sharing of equipment.

The Equipment Service Center may make minor repairs to rented equipment as authorized by a local request to keep the job going. There will be no overhauls or rebuilding. The repairs will be made only to keep the unit working until the project is completed or arrangements can be made for another unit. Transporting and repairs should be included in the contract and provided by the owner.

Equipment rented fully operated and maintained must meet the minimum safety requirements established by Cal/OSHA.

#### **4.18 Towing Equipment**

No equipment shall be towed on the traveled way at road speeds when the weight of the towed unit is more than the towing vehicle, unless the towed unit is equipped with brakes controlled by the towing vehicle. The drawbar or chain length should not exceed 15 feet (4.572 meters) and the vehicle cannot be towed with a chain beyond the nearest exit from a freeway.

(CVC 29005-29006.)

#### **4.19 Maintenance of Equipment**

Dozer blades, log grapples, tongs and buckets on front end loaders, elevating dump bodies, and other components capable of vertical movement by gravity shall be lowered to the ground, blocked or set on a solid support when the machine is parked. Such components shall be mechanically locked or securely blocked to prevent movement before employees are permitted to perform any work on them.

#### **4.20 Maintenance Equipment Training Academy**

The Maintenance Equipment Training Academy (META) is the Caltrans Equipment Operator training program located at the Whitmore Training Center in Northern California.

All Caltrans Maintenance personnel whose duties include operation of equipment, and their supervisors, are required to attend the training facility and learn the basic fundamentals for the proper inspection, preventive maintenance, service, and operation of Caltrans equipment.

The training program includes a mix of classroom, laboratory, and “hands on” equipment operating time.

#### **4.21 Equipment Budget**

The District Division Chief of Maintenance and Operations has responsibility for preparation and submission of the annual District Maintenance Equipment Budget.

Each District shall include complete and self-supporting justification for each addition, upgrade or downgrade, change in mix, or replacement request that is included in the proposed budget.



In addition, the following shall be accomplished before submitting a budget item:

- (A) Identify all units of equipment previously requested and approved that are in process or already purchased, but have not yet been received in the District. Forward a copy of this list to the Headquarters Maintenance Program.
- (B) Describe fully the circumstances that have created the need for upgrade, change in mix, or additional equipment, including the estimated dollar and person year savings.

Describe why a piece of equipment that meets disposal criteria and is proposed for replacement cannot be eliminated from the fleet.

- (C) District Division Chiefs of Maintenance and Operations and Equipment Managers should consult the Maintenance Manager regarding the equipment needs for Superintendents' areas, based on the number and types of equipment required to effectively accomplish the total work load. This should take into account the Superintendents' present equipment inventory, equipment "in process" but not yet received, units predicted for disposal, and District and HQ pool units available on a loan basis. This process should separate true "needs" from "wants".
- (D) Permanent transfer of low usage units and increased sharing within the District shall be considered before a request for equipment is submitted.
- (E) Question each special attachment or feature to be provided with a requested unit.  
  
Anything added increases initial cost and may require a larger vehicle, thereby further increasing initial cost, operating cost, and fuel consumption. Offsetting benefits should be quantified whenever possible.

- (F) Consult with the District Shop Superintendent regarding how air brakes, diesel engines and special attachments will affect the size and weight of requested units. Avoid requesting larger units not compatible with the existing fleet.
- (G) Requests for equipment which are found to be incomplete and/or lack justification will be disapproved in the Maintenance Program budget review process.
- (H) Comply with any other special budget instructions used by the Maintenance Program.

All equipment, except in very rare cases, shall be ordered from the Caltrans Equipment Catalog.

#### **4.22     Parking**

Accident records point out the critical need for proper parking of vehicles and equipment. No vehicle shall be left by the driver without first engaging the transmission into the lowest gear, or in the case of some automatic transmission equipped vehicles, into park, applying the emergency or parking brake and shutting off the engine. Construction type equipment shall also have the blade, bucket, plow, or other attachments lowered to the ground.

The use of chock blocks with vehicles other than aerial lift units is an option of District Management.

A standard chock block configuration has been established and is shown in plate 4-2 at the end of this chapter. Those Districts that have an established chock block policy shall use the standard chock blocks for their vehicles. All new vehicles coming into service will have chock block holders that will match the chock blocks shown in Figure 4-2.

It will be the responsibility of the District to provide the chock blocks.

#### **4.23     Operator Qualification**

Operator qualification testing and training modules exist for most equipment in the Caltrans fleet.

Equipment for which modules exist can only be operated by qualified and properly licensed operators. Equipment for which modules do not exist can be operated if one is properly licensed, checked out and classified.

The qualification program includes time for training in order to prepare for the required testing.

#### **4.24     Abnormal Equipment Failure**

Guidelines and reporting information procedures can be found on form DM-E 253 (Rev. 4/98).

The identification of the failure can be by Maintenance or Equipment Service Center; however, the record of discovery on form DM-E 253 (Rev 4/98) will be signed off by both the District Shop Superintendent and the District Equipment Manager.

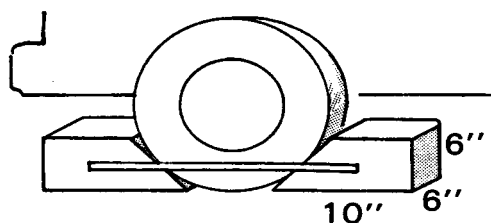
It is the responsibility of the District Equipment Manager to consult with the Functional Unit Manager to pursue the investigation and report findings.

The District Division Chief of Maintenance and Operations has the responsibility to pursue the investigation and report the findings to the Maintenance Program Manager.

These guidelines supersede all previous directions and/or Policy and Procedures.

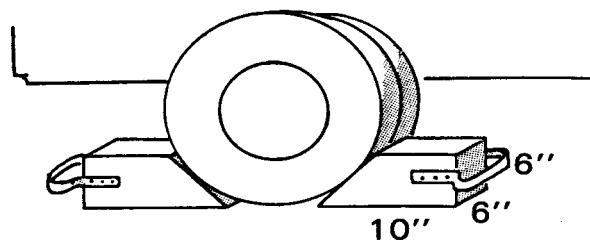
## Use of Chock Blocks

Figure 1



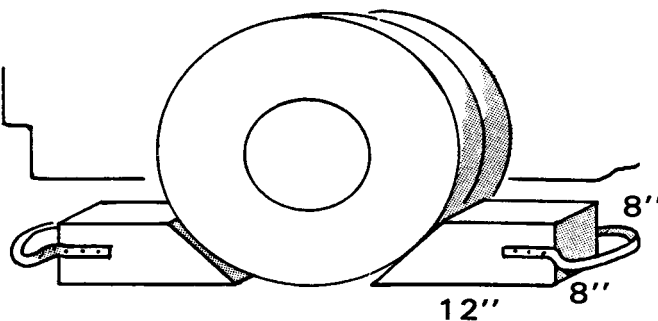
6" x 6" x 10"  
@ 45°

Figure 2



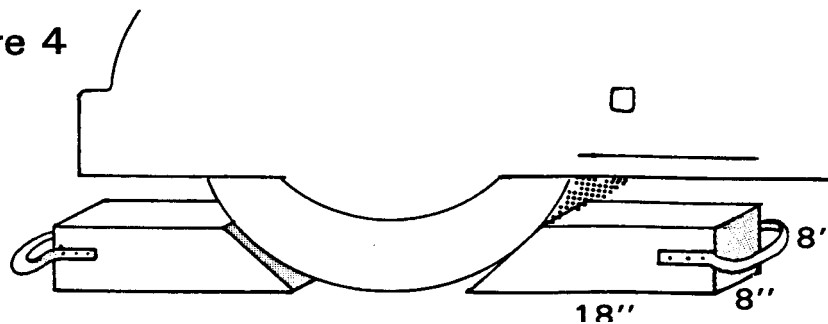
1 Ton  
6" x 6" x 10"  
@ 45°

Figure 3



1 1/2 Ton  
& over  
8" x 8" x 12"  
@ 45°

Figure 4



Iron Wheel  
Roller  
8" x 8" x 18"  
@ 30°

Figure 4-2: Use of Chock Blocks